

Electrical Power and Heating

Electrical Production and Storage

YCCF is not connected to the national electricity grid and produces the vast majority of its electrical power on-site using solar panels connected to small scale distributed load networks. Recycled lead acid batteries are used to buffer generation and demand. Having generation and load in close proximity means that losses are low.

For high power applications such as the use of power tools, a diesel generator is used. In the future YCCF hope to have a workshop which can be run off a combination of a large solar array with inverter and battery bank and a biodiesel generator.

Power can also be generated from a bike generator that was built on-site during a public workshop. The attached charging station can be used to charge up mobile phones and includes a charge-controller and active voltage display when pedaling. This also allows people to have a hands on understanding of energy usage and generation.

Electrical Power Demands

Electricity use on-site is limited by generation capacity. Electricity is primarily used for:

- charging of electronic devices like phones and laptop computers
- running low power LED lights
- pumping water up from the spring to the kitchen
- water filtration system which includes a UV light element
- Operating hand held power tools

Heating and Cooking

Heating and cooking needs are met by wood fuel combustion which is sourced on-site. Wood is harvested according to the Woodland Management Plan (Appendix L). Water can be heated on a rocket stove that can boil a kettle from a handful of twigs, an abundant waste product obtained through appropriate woodland management.

At YCCF an innovative stove design is used called a “Forest Biochar Rocket Stove”. This design uses the chemical process of gasification to produce low emission heat and biochar.

The heat produced by burning wood in the rocket stove causes the wood/biomass insulation in the surrounding chamber (retort) to undergo pyrolysis. The gases produced by the pyrolysis are fed into the stove and burnt, as air does not flow through the retort the wood held within turns into biochar/charcoal rather than burning to an ash.

Unlike much other biochar or charcoal production the burning of the emitted gasses yields about 70% of the energy available from the wood for cooking and heating and also greatly improves the emissions profile of the gasses that are emitted.

The stove was based upon a design by Edward Revill at Swansea Biochar and developed with his assistance.

An additional benefit of using such a design is the production of biochar. Biochar is charcoal made with the intention of incorporating it into the Earth. Making and using biochar has many benefits.

Firstly, it can be used as part of a soil fertility system. It helps to prevent nutrients from being washed out of soil or lost to the atmosphere. It is used as soil admix because it has a massive surface area and a slight electrical charge (cation exchange capacity.)

Nutrients which are otherwise soluble and easily washed out of soils by rain are instead attracted to and bound to this surface area. These nutrients, if washed out of the soil, cause pollution problems in waterways, rather than being made available to plants.

Secondly, biochar is relatively stable, it takes a long time to decompose. Adding biochar to soil is a method of long term carbon capture.



A TLUD Rocket Stove (Soil Carbon Regeneration 2014)